

The Nature of Clinical Depression: Symptoms, Syndromes, and Behavior Analysis

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In this article we discuss the traditional behavioral models of depression and some of the challenges analyzing a phenomenon with such complex and varied features. We present the traditional model and suggest that it does not capture the complexity of the phenomenon, nor do syndromal models of depression that dominate the mainstream conceptualization of depression. Instead, we emphasize ideographic analysis and present depression as a maladaptive dysregulation of an ultimately adaptive elicited emotional response. We emphasize environmental factors, specifically aversive control and private verbal events, in terms of relational frame theory, that may transform an adaptive response into a maladaptive disorder. We consider the role of negative thought processes and rumination, common and debilitating aspects of depression that have traditionally been neglected by behavior analysts.

Key words: clinical depression, clinical behavior analysis

As the field of clinical behavior analysis grows, it will benefit from analyses of increasingly complex and common clinical phenomena, especially those with significant public health implications. One such phenomenon is clinical depression, considered to be the “common cold” of outpatient populations. Up to 25 million people in the United States alone meet criteria for some type of depressive disorder in a given year (M. B. Keller, 1994). Depressive disorders also result in considerable financial expenditure including time spent away from the workplace and an increase in health care costs. Based on broad measures that include work absenteeism, treatment costs, and other factors, the annual economic cost of depressive disorders in the United States may be over \$40 billion (Antonuccio, Thomas, & Danton, 1997). Suicide is the ultimate cost.

Perhaps nowhere in clinical psychology is the medicalization of

behavioral problems more complete than with depression. Depression is largely seen by the general public and mainstream media as a neuropsychiatric illness (e.g., Wingert & Kantrowitz, 2002) with a fluctuating course that is best described in disease-state terms such as *disorder*, *episodes*, *remission*, *recovery*, *relapse*, and *recurrence* (Frank et al., 1991). An additional assumption is that this disorder may be diagnosed and labeled using the symptom checklists of the standard diagnostic system, the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR;* American Psychiatric Association, 2000). The basic ontological assumption is that depression is an illness that occurs episodically and can be described adequately in medical terms. Thus, more depression is treated in primary care than in any other mental health or health care setting (Kessler, McGonagle, Swartz, Blazer, & Nelson, 2003; Shapiro, 1984), and guidelines for treatment in these settings recommend antidepressant treatment without specialty referral unless the patient has complicating factors such as comorbid substance use or suicide risk (Schulberg, Katon, Simon, & Rush, 1998).

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Even in these cases, specialty referral is first to psychiatry for medication management, and only a small number of individuals diagnosed with depression will be seen by a clinical psychologist, much less a behaviorally oriented practitioner.

A hallmark of behavior analysis has been its condemnation of the misappropriation of lay terms as scientific, technical terms (e.g., Skinner, 1945). The first task is precise specification of the behavioral phenomena invoked by the term. There are several obstacles to achieving this precision with the term *depression*, which have been excellently presented for the term *anxiety* by Friman, Hayes, and Wilson (1998). The case for depression is quite similar. First, the term *depression* was never meant as a technical term and actually has a metaphorical, idiomatic basis. Second, our psychiatric nomenclature and mainstream usage of the term suggest that depression is an empirical phenomenon with an essential composition. To a behavior analyst, the term *depression* is not a technical term, does not precisely map onto any empirical or behavioral phenomena, and has no essential composition. Thus, given the exhaustive medicalization of the phenomenon of depression, there exists an immense gap between a behavioral analysis of depression and mainstream usage of it as a medical term with its various associations and meanings.

Behavior-analytic writings on clinical depression (e.g., Dougher & Hackbert, 1994, 2000; Ferster, 1973; Lewinsohn, 1974; see Eifert, Beach, & Wilson, 1998, for an alternative, paradigmatic behavioral model) have been illuminative but sparse. Although research on depression has outpaced research on virtually every other disorder by psychiatric and cognitive-behavioral researchers, behavior analysts have been alarmingly silent. There are undoubtedly many reasons for this silence (e.g., a lack of

training programs that focus on behavior analysis and traditional psychopathology and more reinforcement for studying familiar topics). More relevant to the current paper is the possibility that the exhaustive medicalization of the term; the wealth of non-behavior-analytic research data on biology and genetics, personality, and cognitive factors; and the emphasis on private events in depression—on how depression *feels* and on changing that feeling—may function to evoke avoidance in behavior analysts.

This is unfortunate, because behavior analysis can not only provide an integrative view of depression, taking into consideration genetics, biology, enduring patterns of responding labeled *personality*, verbal (“cognitive”) behavior, and private events, but it can do so with a theoretical consistency and pragmatic utility unmatched by other theoretical systems. In this paper we attempt to start at the beginning, with a discussion of what depression is to a behavior analyst and how this contrasts with mainstream usage of the term as a medical syndrome. We review the traditional operant model of depression that emphasized reductions in behavior as a response to environmental events. We then tackle several areas of inquiry important to an understanding of depression that have traditionally been neglected by behavior analysts, including private events and the role of verbal behavior in depression. We see this not as completing a behavioral analysis but as a reminder of the importance of idiographic, functional analyses of specific individuals for this complex phenomenon.

WHAT IS DEPRESSION? TACTING DEPRESSION AND ITS SYMPTOMS

We describe depression in radical behavioral terms, emphasizing the occasions on which the term is used

and deemphasizing any underlying unitary disease, physiological, or emotional state to which the term refers. *Depression* comes from the late Latin word *depressare* and the classical Latin word *deprimere*. *Deprimere* literally means “press down”; *de* translates into “down” and *primere* translates into “to press.” In essence, the term appears to denote a feeling of heaviness, of being “pressed down,” that is also referred to as “sad,” “blue,” or simply “down.” *Depression* also refers to a depressed topography or the fact of being pressed down. Depression as a referent to mood or emotional state appeared as early as 1665 and merely meant a lowering of mood or spirits (Simpson & Weiner, 1989). Thus, the core experience of depression appears to be a private event tacted as *depressed* or in psychiatric terms as *dysphoric*. However, a minority of individuals will meet criteria for depression and deny depressed mood or present with irritable mood instead. These individuals may have deficits in accurate tacting of private experience, or they may represent diagnostic Type II errors and should not be classified as depressed.

It is important not to associate what is tacted as *depression* with a specific pattern of physiological responding or reify it as a particular emotional state. The antecedent conditions and underlying physiologies associated with the experience of depression may vary widely, and no core composition can be assumed. Emotional states such as sadness are simply co-occurring behavioral responses (elicited unconditioned reflexes, conditioned reflexes, operant predispositions) that appear to be integrated because the behaviors are occasioned by common discriminanda and are controlled by common consequences (Skinner, 1953). For example, a child with overbearing parents experiences an emotional state of sadness and a co-occurring behavioral response of crying when

her parents criticize her. The crying is negatively reinforced when her parents comfort her and stop criticizing her, which may also result in a change of her emotional state.

The particular quality of an emotional state labeled *depression* should vary with the characteristics of the environmental triggers. For example, private events labeled as *depressed* may be associated with overworking and receiving little reinforcement for long stretches of time or with grieving the death of a loved partner. In each case the underlying physiology is presumably different, but the experienced phenomena may be sufficiently similar to prompt the tact. More specific discrimination training may be useful (e.g., the first situation may be better labeled as *burned out* and the second as *grieving*) but given the problems associated with training the tacting of private events (Moore, 1980) it is not clear that an individual will be able to make these discriminations reliably.

The psychiatric nomenclature emphasizes this core experience and several additional symptoms. Depressed mood or dysphoria is the primary feature of major depressive disorder (MDD), the most common depressive diagnosis. In addition to this core experience, there are several other symptoms of MDD, including loss of interest in activities, sleep and appetite changes, guilt and hopelessness, fatigue, restlessness, concentration problems, and suicidal ideation. As discussed in detail below, the medical model holds that this constellation of symptoms represents a syndrome, but complexity is immediately introduced because the presence and nature of these symptoms vary considerably across clients (Líndal & Stefánsson, 1991). For example, some clients experience vegetative symptoms of depression (decreased appetite and insomnia) whereas, less commonly, others experience reversed vegetative symptoms of increased appetite and hypersomnia.

Similarly, psychomotor retardation is more common and agitation is less common, and both may be demonstrated by the same individual at different times.

To account for this complexity, *DSM-IV-TR* has parsed depression into various additional categories, each with similar and overlapping characteristics, and there are an increasing number of diagnostic categories of depressive disorders or problems involving sad or irritable affect. In fact, Appendix B of *DSM-IV-TR* lists 17 proposed disorders for further study, six of which deal with disorders of mood. Although detailed review of these subcategories is outside the purview of this paper, it should be noted that although there may indeed be different syndromes with different etiologies and treatment implications, a behavior-analytic view holds that the current proliferation of depressive disorders is largely unnecessary. We see not several distinct disorders but a phenomenon of depression with great variability in time course, symptom severity, and correlated conditions. All the disorders share a depressed mood symptom that parallels the core experience of the problem, and all share several additional criteria with MDD, often differing only in duration or number of symptoms. From an idiographic behavior-analytic perspective, there exists not one or three or several depressive disorders—there are as many depressive disorders as there are depressed individuals.

The constellation of depressive disorders with shared characteristics suggests that the tact *depression* involves a variety of public and private antecedent stimulating events that vary from occasion to occasion but have sufficient overlapping properties to occasion consistent usage of the term. We view the diversity of additional symptoms represented by these disorders as consistent with the diversity of environmental causes of

depression, physiological states labeled *depression*, and psychological responses to the environmental causes and physiological states. Thus, no overarching depressive syndromes are posited or assumed at this point. Nonetheless, commonalities in history, environmental antecedents, and symptom presentation exist and may guide treatment decisions.

Thus, our understanding of depression must allow for the great variety of stimulus conditions that occasion use of the term. We can discard several classes of use that we can simply label as incorrect. For example, an individual learning a foreign language may simply state the wrong word. Likewise, a person may be diagnosed with depression but later it is determined that the person has a large cancerous tumor that is causing the symptoms. Although a complete behavioral analysis must account for these usages, they are not interesting from a clinical standpoint. More important are instances in which the term is not used but could be. For example, a person visits a psychologist and complains of several symptoms of depression but not depressed mood. Another person would label the private experience as “depressed,” but the current client did not develop adequate private stimulus control over the experience. The psychologist performs a diagnostic interview, and the client falls one symptom short of the diagnosis of MDD. In this case it is advantageous to consider the person depressed even though it is possible that neither the psychologist nor the client will use the term.

TRADITIONAL BEHAVIORAL MODELS OF DEPRESSION

Skinner wrote very little on depression; when he did, he emphasized overt behavior rather than the core affective experience, in line with an operant rather than respondent model. For example, in 1953 he wrote,

If we remove a man from his characteristic surroundings, a large part of his social behavior cannot be emitted and may therefore become more and more probable: he will return to his old surroundings whenever possible and will be particularly "sociable" when he does so. Other parts of his behavior become strong because they are automatically reinforced under the prevailing deprivation; he will talk to anyone who will listen about his old surroundings, his old friends, and what he used to do. This is all a result of deprivation. But nostalgia is also an emotional condition in which there is a general weakening of other forms of behavior—a "depression," which may be quite profound. We cannot classify this as the result of deprivation because the behavior which is thus affected has not been specifically restrained. (p. 165)

Three aspects of this passage are noteworthy. First, as Skinner typically did, by placing the term *depression* in quotes he was careful to avoid giving it any special status other than that of a verbal description. As discussed above, this practice of placing such terms in quotes may be awkward and tiresome but serves as a reminder that certain assumptions are not to be made when using them. The quotes also serve as a reminder of an important verbal quality to the term, discussed below. Second, Skinner described the core experience as an "emotional condition," suggesting an elicited component. Consistent with an operant model, he did not elaborate on this point and instead focused on overt behavioral reductions. Third, Skinner highlighted the centrality of reduced positive reinforcement in depression. Simply put, social behavior depends on a reinforcing environment; change the environment so that responses do not yield reinforcement and one reduces the behavior.

This notion became the foundation of Lewinsohn's (1974) theory and dominated the behavioral literature for several decades. Lewinsohn described depression as characterized primarily by a low rate of response-contingent positive reinforcement (RCPR). In a nutshell, Lewinsohn emphasized environmental events that

produce losses of major sources of RCPR, such as a divorce or the loss of a job, and social skills deficits that limit an individual's ability to reobtain RCPR once it has been lost. Thus, his model focused on the behavioral reductions often seen in depression. Lewinsohn assumed the core experience to be an elicited by-product of these situations, but he did not detail this process. Other symptoms of depression (e.g., fatigue, somatic symptoms, and cognitive symptoms) were assumed to be evoked or to be secondary elaborations of other symptoms.

We hold that Lewinsohn's (1974) characterization of the core affective experience of depression as an elicited by-product of losses of or reductions in positive reinforcement is fundamental to understanding depression. Some cases of depression clearly are described best by Lewinsohn's model, such as single, discrete episodes of depression with clear environmental precipitants and with symptom profiles that emphasize behavioral reductions that resolve when the environments are reinstated. For example, a person may become depressed after a divorce or loss of job, and the depression resolves when the person finds a new relationship partner or a new job. With cases of chronic depression, Lewinsohn's model emphasizes persistently insufficient levels of reinforcement and social skills deficits that prevent the individual from changing the situation, and this model also seems to be adequate for some cases. For example, a person who becomes depressed after a divorce, resulting in a net reduction in positive reinforcement, and does not have adequate social skills for initiating new romantic relationships will likely become chronically depressed until the necessary social skills are learned.

All of this is nothing new. However, Lewinsohn's (1974) model vastly underestimated the variety and complexity of factors that can reduce

behavior. Indeed, the field of behavior analysis, if nothing else, has demonstrated functional processes that can increase or decrease behavior. All functional processes that decrease behavior are potentially relevant, if the behavioral reductions produced are large and generalized and a dysphoric reaction occurs concomitant with the behavioral reductions. For example, extreme persistent and uncontrollable punishment may lead to substantial behavioral reductions, elicited negative affect, and depression as per Seligman's early learned helplessness model (Overmier & Seligman, 1967).

Further consideration of this complexity is provided by Hopko, Lejuez, Ruggiero, and Eifert (2003) and Lejuez, Hopko, and Hopko (2001), who analyzed depression in terms of the matching law (Herrnstein, 1970). Briefly, this suggests that the behavioral reductions seen in depression are not accurately seen as the simple product of reductions in positive reinforcement but rather as the product of ratios of reinforcement for depressed relative to nondepressed (or healthy) behavior. In other words, the sum total of reinforcement available in a person's environment must be taken into consideration, not just reinforcement for target behaviors. As a simple example, a depressed person may not get out of bed due to loss of a job (loss of positive reinforcer for getting out of bed), but positive reinforcers for staying in bed (e.g., spouse who now takes care of the person or makes the person breakfast) must also be considered. The bottom line is that the situation is complicated, and nothing less than a complete functional analysis of the individual's environment is required if one is to attempt a full functional analysis of depression.

Aversive Control in Depression

Skinner also suggested that depression may be an emotional response to

aversive controlling practices, especially aversive social control (1953, pp. 360–363). Similarly, Ferster (1973) suggested that depression is characterized as much by increased escape and avoidance repertoires as by reduced positive repertoires. In fact, research indicates that more cases of depression are characterized by the accrual of multiple chronic mild stressors, such as work-related stress, homemaking demands, and financial trouble than by major losses such as divorce or the loss of a job (Billings & Moos, 1984; Kessler, 1997; Mazure, 1998; Monroe & Depue, 1991; Paykel, 1982). In these cases we suggest that the core elicited affective experience of depression is as much a product of increased aversive control as it is reduced appetitive control.

It is important to recognize, however, that the two sources of control are often intimately related. Ferster (1973) suggested that the depressed escape and avoidance repertoire is largely passive, which also leads to a decrease in positive reinforcement relative to what an active repertoire would provide. For example, consider a client who stayed in bed all day and did not go to work, thereby avoiding a stressful meeting with his boss where he believed he was going to be reprimanded. Staying in bed successfully avoids this outcome, but it also prevents contact with other contingencies that might function to ameliorate depression—for example, if the client was wrong and no reprimand was forthcoming. Similarly, an individual with social phobia, which is highly comorbid with depression (Mineka, Watson, & Clark, 1998), may be negatively reinforced by successfully avoiding situations that may result in social humiliation or embarrassment, but avoidance of such situations also reduces opportunities for contact with positive social reinforcement. In other words, an increase in aversive social control here almost guarantees a decrease in appetitive social control. These aver-

sive environments evoke and maintain behavior that is immediately effective as a response to these contingencies but maladaptive over the long term in that access to positive reinforcers is diminished.

Such aversive situations may elicit anxiety rather than depression per se, but the point is that a repertoire characterized by excessive escape and avoidance behavior (and elicited affect labeled *anxiety*) will undoubtedly result in decreased contact with positive reinforcement (and elicited affect labeled *depression*) over time. Thus, anxiety should precede and then become comorbid with depression, and this pattern appears to characterize many comorbid cases (Mineka et al., 1998). In fact, the well-established comorbidity of anxiety and depressive disorders should be a function of the degree to which anxious avoidance also results in a loss of positive reinforcement. Hayes, Wilson, Gifford, Follette, and Strosahl (1996) have provided a convincing review showing that avoidance may underlie a host of psychological problems, including depression, and the specific relation between avoidance and depression has received empirical support as well (reviewed by Ottenbreit & Dobson, 2004). Finally, research indicates that over the course of treatment for social phobia, change in anxiety predicts change in depression, but change in depression does not predict change in anxiety (Moscovitch, Hofmann, Suwak, & In-Albon, 2005), suggesting that symptoms of depression are at least partially maintained by a social environment that has aversive functions.

To summarize our analysis to this point, there are many pathways to depression. *Depression* is not a precise, technical term and has no essential composition. It is not a syndrome. The term refers to a chronic experience of feeling sad or down and to associated symptoms that vary widely. This symptomatic

heterogeneity is due to the heterogeneity of historical and environmental controlling variables. That said, some processes may be more common in depression, and awareness of these processes would help to limit what could be a vast assessment of many potentially irrelevant variables (Hayes & Follette, 1992). Two broad processes have been highlighted here: (a) losses of, reductions in, or persistently insufficient levels of positive reinforcement as per Lewinsohn (1974), and (b) increases in environmental aversive control (negatively reinforcing and punishment contingencies). When chronic, both processes may be seen as functioning as enduring motivating operations for depression (Dougher & Hackbert, 2000). Of course, multiple sources of control are probable.

AN ADAPTIVE SYNDROME OR MALADAPTIVE RESPONSE? GENETICS AND EVOLUTIONARY THEORIES

In contrast to an idiographic functional analysis of depression, the medical disease model posits that depression is a syndrome or multiple syndromes and one inherits risk for this syndromal response. The model relies to a considerable degree on research indicating at least some genetic involvement in depression (Wallace, Schneider, & McGuffin, 2002). However, the family, twin, and adoption studies on which this conclusion is based point to a larger environmental contribution than genetic contribution in all but the most severe cases of depression (Wallace et al., 2002). Furthermore, researchers and theorists from a variety of perspectives have highlighted methodological flaws and unsubstantiated assumptions of this research (Ceci & Williams, 1999; Hayes, 1998; Turkheimer, 1998) that have the collective effect of lowering heritability estimates even further as well as questioning their very basis. Nonetheless, it seems likely that some inherited

vulnerability to depression exists in some cases, and a full behavior-analytic account can include this possibility.

A typical behavioral argument against the medical disease model of depression is to accept that depression is a syndrome but posit that it is adaptive, the product of contingencies of survival (Skinner, 1953). In fact, many evolutionary explanations for depression have been offered (e.g., Bowlby, 1980; Gilbert, 1992; Leahy, 1997; Price, Sloman, Gardner, Gilbert, & Rohde, 1994; P. J. Watson & Andrews, 2002; see McGuire & Troisi, 1998, for a review), and such evolutionary accounts are important to consider and are consistent with behavioral theory (Corwin & O'Donohue, 1995). There are three broad themes under which these theories fall: resource conservation, social competition, and attachment (Allen & Badcock, 2003).

Theories of resource conservation posit that depression permits the conservation of resources and disengagement from unsuccessful goal-directed activity by decreasing appetite, energy levels, and motivation (Leahy, 1997; Nesse, 2000). For instance, when in a new environment with unknown contingencies, such as traveling to a foreign country, one is more likely to be functioning in a way to avoid negative reinforcement or punishment while trying to learn the rules of the new environment. If one were to engage in a goal-directed activity, such as trying to obtain a job, one would likely not be successful. Social-competition theories view depression as a deescalation or yielding reaction to a defeat. This is said to be adaptive because it signals submission to the victor and allows acceptance of social subordination and the avoidance of unnecessary conflict (Price, 1967, 1998; Price et al., 1994). An example of this can be seen in a boxing match, when one fighter is knocked down for a full 10 counts. The loser typically displays

behaviors including sloped posture, decreased eye contact, and avoidance (all depressed behaviors) as opposed to getting back up and continuing to fight. Finally, attachment theories of the adaptive nature of depression claim that a depressive reaction is an adaptive response to the loss of interpersonal relationships that helps to maintain the proximity of caregivers or reestablish an attachment by signaling a need for assistance from others and eliciting that assistance (Averill, 1968; Bowlby, 1980; Frijda, 1994). This can easily be seen by a lost boy in a busy mall. When the child begins to cry, passersby typically attend to him, try to find the boy's parents, and comfort him during the search.

We suggest that depression is neither a syndrome nor adaptive. Any theory of depression as an adaptive syndrome has to overcome two primary hurdles inherent in the phenomenon. First, given the variability in symptom profiles in depression, one has to pick which set of symptoms of depression comprises the syndrome, or alternately posit multiple syndromes with different symptom sets (M. C. Keller & Nesse, 2006). For example, are both melancholic and atypical depression adaptive syndromes? Given that some of symptoms associated with melancholic depression (insomnia and loss of appetite) are the opposite of those associated with atypical depression (hypersomnia and increased appetite), it is impossible for the same theory to account for both presentations.

Second, the nature and chronicity of depressive symptoms seem to be maladaptive. For example, a transient sad mood in response to a loss certainly seems adaptive in that it elicits empathy and evokes helping behaviors in others. If this is true, then such an affective respondent reaction may have evolved due to contingencies of survival. It would be expected to have certain losses as

antecedents and to resolve when support is acquired. However, in clinical depression the sad mood is often chronic and unresponsive to helping behaviors. In fact, although the evolutionary account suggests that the response should garner social support, research is clear that depressive behaviors result in decreased social support (Coyne, 1976; Gotlib & Lee, 1989; Joiner & Metalsky, 2001) and worse psychosocial functioning in general (Barnett & Gotlib, 1988). Suicide is another example. Although suicidal gestures may be seen as operant attempts to garner support (Linehan, 1993), completed suicide is difficult to conceive of as an operant (i.e., learned) behavior (Hayes, Strosahl, & Wilson, 1999) and is clearly not adaptive in terms of survival.

A more likely scenario is that depression itself is not adaptive, but the core experience represents a variation of an adaptive affective response (Nettle, 2004; also see Nesse, 2000). In other words, the capability to experience moderate low mood or sadness in appropriate situations (but not become clinically depressed) may have many of the same short-term benefits that have been used to support the claim that depression is adaptive. Support for this view comes from personality researchers, who have posited the temperamental trait of negative affectivity as a trait that is selected for and normally distributed (Nettle, 2004; D. Watson & Clark, 1984), and considerable research suggests that this trait may be a vulnerability factor for both depression and anxiety (L. A. Clark & Watson, 1991; L. A. Clark, Watson, & Mineka, 1994).

Although the notions of temperament or traits are unnecessary, it is reasonable to suggest that there may be a range in the duration and magnitude of affective reactions that are adaptive. A depressed individual could represent a deviation from that range in that he or she experiences negative affect longer and to a greater

extent in response to an environmental event. In other words, the propensity to experience mild and appropriate levels of negative affect may be adaptive and thus appear on a continuum; those at one of the extreme ends of this continuum may be quite sensitive to fluctuations in reinforcement contingencies, suffer from chronic negative affect, and be at risk for clinical depression.

It is important to remember that we are proposing a scenario in which there is a genetic contribution to the likelihood of the core affective experience in depression but the remaining symptoms are potentially free to vary and should be described in terms of antecedents and consequences. Of course, there may be an adaptive, normally distributed range in the sensitivity of these additional behaviors (e.g., sleep) to environmental stimuli that represent separate inherited vulnerabilities. This view of depression is consistent with recent biological findings that suggest that depression is likely a product of multiple genes and a complex gene-environment interaction (Wallace et al., 2002), as well as neuroscientific findings of mixed and variable structural and functional abnormalities in several brain regions, with few depressed individuals displaying the complete package of deficits, leading researchers to conclude that depression refers to a heterogeneous group of disorders as well (Davidson, Pizzagalli, Nitschke, & Putnam, 2002). Thus, other scientific fields are taking tentative steps away from a syndromal view of depression and toward an idiographic analysis.

THE SHIFT FROM ADAPTIVE TO MALADAPTIVE BEHAVIOR

As discussed above, elicited affective experiences are normal, adaptive, and not disordered. Depression appears to be a maladaptive dysregulation or extension of this adaptive

experience. Genetic vulnerabilities aside, it is important to identify the historical and environmental processes responsible for this shift from a normal, adaptive experience of elicited affect to a disordered experience of depression.

Obviously, chronically maladaptive environments may produce chronically maladaptive behavior. Perhaps the simplest and ultimate example of this is a concentration camp (Frankel, 1984). Such an environment, almost completely lacking in positive reinforcers and abundant in stable and salient aversive stimuli, may result in rather consistent depressed behavior and negative affect. However, it is safe to say that most depressed people do not live in such environments. Processes through which environments characterized by variable positive and negative reinforcers and punishers result in relatively stable experiences of depression need to be identified. For example, consider a person who has a handful of close friends with whom she interacts with on a regular basis, men who are showing interest in her romantically, good career prospects including an upcoming promotion (all opportunities for positive reinforcement), but still cannot sleep at night and considers herself to be depressed. The question remains, why do so many people engage in repertoires that are more consistent with impoverished environments than with those environments in which they live? Below we consider two processes: avoidance of aversive private events and the role of verbal behavior.

Avoidance of Private Events

Two similar processes by which an adaptive elicited response can lead to chronic and maladaptive depression in the absence of chronically maladaptive environments recently have been proposed and linked to treatment techniques: Martell, Addis, and Jacobson's (2001) theory behind be-

havioral activation (BA) and Hayes et al.'s (1999) model of experiential avoidance for acceptance and commitment therapy (ACT). The two models differ in several respects (see Kanter, Baruch, & Gaynor, 2006, for a full comparison).

Both models argue that problematic avoidance in depression is not always a response to the environment per se, but is a response to the core aversive experience of depression (which is in turn a response to the environment). Both models suggest that the core affective experience, once elicited, may play a functional role in maintaining, exacerbating, and creating the additional symptoms of depression. Specifically, if we allow that the initial elicited private response is functionally aversive, it may evoke behavior designed to avoid and escape the private response. For example, after a difficult breakup, a man may experience an increase in feelings of anxiety and negative self-referential thoughts. Although this individual now may avoid public stimuli based on formal stimulus properties (e.g., romantic relationships), he also may avoid the newly elicited thoughts and feelings in a variety of ways (e.g., heavy drinking). The key to understanding how this applies to depression is the notion that avoidance of private events, even when it works in the short term, produces additional long-term problems. In the example above, the man feels better in the short run after drinking, but the long-term consequences would likely include an even more impoverished environment. Through this process, flexible repertoires of problem solving and repertoires based on stable positive reinforcement are either extinguished, depotentiated, or never developed.

BA interventions have focused on disrupting how aversive private events can function as discriminative stimuli or motivating operations for avoidance behavior. For example, consider a client who stayed in bed all day

because she felt depressed and thereby was able to avoid the additional stress and fatigue associated with her unpleasant work situation. Although she may experience her work situation as aversive to some extent at all times, the heaviness and fatigue experienced upon awakening in the morning and tacted as “feeling depressed” may signal that working would be experienced as especially aversive on that particular day. According to BA, staying in bed in this situation is negatively reinforced through avoidance of an especially aversive work day. However, it creates more long-term problems and solves none in that it does nothing to address the aversive work situation proactively (Kanter et al., 2006).

ACT offers additional theoretical elaborations that suggest a more prominent role for verbal behavior in avoidance processes. First, ACT suggests that experiential avoidance repertoires are maintained over long periods of time because they are rule governed or verbally controlled (Hayes & Ju, 1998). In other words, individuals develop rules that dictate experiential avoidance, and these rule-governed avoidance repertoires may persist in the face of histories of reinforcement to the contrary. For example, a depressed man may tell himself, “If bad things happen in my life, I will take it like a man.” Such self-talk may lead to denial of certain private events such as sadness or grief (e.g., after his father died) despite an environment that would shape more effective behavior (e.g., a loving wife who wants to discuss his feelings), were it not for verbal control.

There may in fact be no way to distinguish a rule-governed avoidance repertoire (i.e., ACT) from a directly conditioned avoidance repertoire (i.e., BA) in a clinical setting, in that the topographies may look similar, the relevant reinforcement histories are distal, and reporting on them accurately will be unreliable. At issue is the degree to which a depressed individual’s avoidance is rule governed. In

fact, Rehm (1979, 1989) has argued that depressed individuals demonstrate deficits in the ability to generate and follow rules, and his self-management therapy program attempts to improve self-monitoring, self-evaluation, and self-reinforcement skills. In accord with these views are findings that depressed individuals demonstrate increased self-reported preferences for immediate over delayed reinforcement compared to nondepressed individuals, suggesting less rule following in depressed individuals (Rehm & Plakosh, 1975). Two additional studies have shown that dysphoric individuals demonstrate greater schedule sensitivity and less rule-governed behavior compared to nondepressed individuals (Baruch, Kanter, Busch, Richardson, & Barnes-Holmes, 2007; Rosenfarb, Burker, Morris, & Cush, 1993). However, these studies demonstrate significant variability in schedule sensitivity, and McAuliffe (2003) found the opposite (increased rule-governed behavior in depressed adolescents), again highlighting the need for idiographic analysis and acknowledging both increased rule-governed behavior and decreased rule-governed behavior to be problematic in depression.

To reiterate the important themes at this point, it bears repeating that an idiographic analysis is required. Some cases of depression may be adequately conceptualized in terms of Lewinsohn’s (1974) traditional model of reductions in response-contingent positive reinforcement, whereas others may be more accurately conceptualized in terms of ACT’s or BA’s models of avoidance. In both the traditional model and the new conceptualizations, the core experience is seen as an elicited response to environmental events that produce reductions in positive reinforcement. However, the new conceptualizations speculate how one’s reaction to that experience may in fact perpetuate and exacerbate it, and in some cases this may be the case.

The functions of private events in behavior analysis. Allowing that a private response is functionally aversive creates some problems for behavior analysis. Simply put, the classic exhortation to focus functional analyses on manipulable environmental variables may lead some to conclude that private events are simple respondent by-products and have no functional value. This stance on the nonfunctional value of private events is one of the great perplexities of behavior analysis. It is a perplexity because, to most humans, thoughts and emotions—as we have come to label them—are not only felt quite strongly at times but it *feels as if they control our behavior* (Schnaitter, 1978). This is especially true regarding avoidance behavior, which is often described as negatively reinforced by a reduction in aversive emotional experience (e.g., Barlow, 2002). In other words, it seems as if we avoid not only the conditions that occasion depression but also *feeling depression* itself. It may have been behavior analysts' rigid adherence to this simple view of private events, which runs counter to common sense for many researchers, therapists, and clients, that bolstered the cognitive revolution and the subsequent obsolescence of behavioral approaches to treatment of depression, as well as adult outpatient psychotherapy in general, which is dominated by "feeling" talk.

Skinner presented a much more nuanced and complex view. On the one hand, he consistently defined reinforcers and discriminative stimuli as environmental stimuli on pragmatic rather than ontological grounds (Skinner, 1945, 1953). Simply put, reinforcers are labeled as such only if functional analysis has determined, or at least in principle could determine, that a manipulable event evidences such a function. Private events in general are not manipulable in this sense and thus have been typically defined as dependent rather than

independent variables. Put differently, Skinner consistently argued that emotions are not causes.

However, in other places Skinner allowed private events to participate, partially, in the control of behavior. For example, he wrote,

Emotional responses may be interpreted as in part an escape from the emotional components of anxiety. Thus we avoid the dentist's office, not only because it precedes painful stimulation and is therefore a negative reinforcer, but because, having preceded such stimulation, it arouses a complex emotional condition which is also aversive. The total effect may be extremely powerful. (1953, p. 179)

In this example, the emotional components of anxiety clearly have taken on functional stimulus properties. Likewise, Skinner's analysis of self-knowledge (1957, 1974) depended heavily on the supposition that private events exert discriminative control over tacting. In this case, the use of the term *private event* rather than *private behavior* may have been Skinner's acknowledgment of the complexity, but the complexity is not resolved simply by changing the term. In these cases, although the private events in question are assumed to have acquired at least partial control over other behavior, environmental variables are important for the historical development of the control (see also Hayes & Brownstein, 1986). For example, in the case of the tact of "sad," the private stimulation involved is seen as the discriminative stimulus for the resulting tact, and that stimulation has obtained functional significance through social mediation (Moore, 1980). Thus, it is consistent with behavior analysis (or at least, with behavior analysis's inconsistency) to allow functionally salient private events to evoke avoidance behavior.

The Role of Verbal Behavior in Depression

Perhaps the biggest obstacle for traditional behavioral theorists to

overcome when discussing depression is the role of language. In general, an extremely large and unquestionable body of research establishes the presence of negative cognitive content during depressive episodes, leading cognitive researchers to assume a causal role for cognition in depression (D. A. Clark, Beck, & Alford, 1999). Although longitudinal research has failed to establish negative cognitive biases as independent predictors of depression (Ingram, Miranda, & Segal, 1998), it is clear that thinking influences feeling on a moment-to-moment basis. Cognitive researchers see this influence as sufficiently causal, but behavior analysts instead search for environmental conditions responsible for such behavior-behavior relations (Hayes & Brownstein, 1986). Regardless, it is clear that negative thinking predominates in many depressions, and such thinking may elicit aversive affect.

Research on stimulus equivalence (e.g., Sidman, 1994) readily accounts for the relation between cognition and mood. Simply put, through participation in equivalence relations with nonverbal stimuli, verbal stimuli may obtain eliciting functions. Although there are many examples of this effect, perhaps the clearest example is work by Dougher and colleagues on the transfer of aversive elicitation and avoidance functions through equivalence classes. Using match-to-sample procedures, Dougher, Augustson, Markham, Greenway, and Wulfert (1994) taught 8 subjects two four-member equivalence classes, paired one member of one class with electric shock, and then demonstrated transfer of elicited arousal to other members of the class that had not been directly paired with the shock. Augustson and Dougher (1997) subsequently demonstrated that avoidance responding similarly transfers through equivalence classes. After pairing one member of one class with shock, subjects were taught that they could avoid this member by repeatedly

pressing a key on the keyboard. Subjects then demonstrated transfer of avoidance response functions to other class members.

Growing research on relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) extends these findings. According to RFT, verbal behavior (including thinking) is technically seen as the behavior of framing events relationally: responding to one stimulus in terms of its given or inferred relation to other stimuli. For example, a woman caught speeding receives a ticket. If that person thinks that people who get speeding tickets are bad drivers, she may then consider herself a bad driver. RFT views equivalence as just one type of relation (i.e., *sameness*) and views deriving relations among stimuli in the absence of direct conditioning as a generalized operant (Barnes-Holmes & Barnes-Holmes, 2000).

Responding in accordance with other derived relations has also been demonstrated, including relations of *sameness*, *opposition*, and *difference* (Roche & Barnes, 1996, 1997; Steele & Hayes, 1991; Whelan & Barnes-Holmes, 2004), *more than* and *less than* (Dymond & Barnes, 1995; O'Hora, Roche, Barnes-Holmes, & Smeets, 2002; Whelan, Barnes-Holmes, & Dymond, 2006), and *before* and *after* (O'Hora, Barnes-Holmes, Roche, & Smeets, 2004; see also Barnes & Roche, 1996; Hayes & Barnes, 1997). Evidence is mounting that these relations may result in the *transformation of functions* in accordance with the relations trained, akin to the transfer of function seen with equivalence relations (for a review, see Dymond & Rehfeldt, 2001). Thus if that same woman who received a speeding ticket has a history of avoiding authority figures who reprimanded her in the past (e.g., teachers and supervisors), she may then begin to avoid police officers as well. These stimulus functions may be quite arbitrary and unrelated to current

environmental features. Thus, the behavior of relational framing has a potentially transformative effect on the environment; environmental stimuli that would otherwise control behavior may not do so and new stimuli, idiosyncratic to the individual's verbal learning history, may exert control.

The importance of these findings to depression, and other psychological disorders, cannot be overstated. To the extent that stimulus equivalence and RFT present a behavior-analytic model of language and cognition, these theories provide behavior analysts with a vocabulary and theory with which cognitive variables can be conceptualized and understood. Negative self-statements so often seen in depression acquire their meanings and functions through transformations of function that occur in relational framing. For verbal stimuli to obtain these specific functions, previous specific-exemplar training involving the specific stimuli participating in relational frames is not necessary. All that is necessary is a history that establishes relational framing as a generalized operant and a history in which the specific stimuli at issue are related in a relational network.

There appear to be two uses of the term *relational network*, and a brief diversion on this issue is necessary because one of the usages may be potentially confusing to behavior analysts. First, a relational network may refer to a sentence or another unit of speech that sets the context for relational activity (Barnes-Holmes, Hayes, Dymond, & O'Hora, 2001)—there is no issue with this usage. Second, a relational network may be used to graphically depict the full set of relations between specific stimuli and the transformations of function that are relevant to a particular stimulus. Such networks are often displayed in RFT or stimulus equivalence experiments to depict the specific relations trained, but a net-

work may also be employed more loosely when the history can only be assumed. For example, Blackledge (2003) displayed a network to account for a person taking a walk in the woods that elicits fear due to a verbal history in which it was learned that snakes are to be found in woods. This usage bears considerable resemblance to nonbehavioral entities such as schemas and requires clarification. One has to be careful to maintain that the network, unlike a schema, is not the cause of behavior. The network is a description of a history, and it is this history, along with the current environmental and verbal events, that functions as the cause. The history is described in terms of a network to emphasize how the functions of any term in the network may be transformed in accordance with the network, but such transformations are a product of a history of verbal behavior described as a network, not the network per se. It is easy to lose sight of behavior analysis at this point; thus, it is important to remember that these functions of relational framing were obtained through a history of interaction with the social and verbal community. Historical environmental factors result in the transformation and reduction of control by the current environment. These effects are easily described in terms of relational networks and stimulus functions that are transformed across members of the network.

The important point is that verbal behavior can dysregulate and extend normal adaptive experiences of aversive elicitation into disordered experiences. Consider an individual who has received a poor work evaluation. This naturally elicits aversive affect that, if transient, can be considered normal and adaptive. However, this individual may begin to think about the event, and the content of thinking will be a complex product of multiple historical and current antecedents. Given a history that has established

high-strength relational networks of “loss,” “failure,” “helplessness,” or similar networks, a transient setback such as a poor job evaluation can become functionally overwhelming. The key point is that the core experience of depression, the elicited affect, was normal and adaptive without verbal elaboration. With verbal elaboration, however, the experience is magnified and extended, and may become disordered.

Examples of verbal elaborations of potentially normal experiences abound in the clinical literature on depression. In fact, cognitive therapy for depression (Beck, Rush, Shaw, & Emery, 1979) assumes challenging these unrealistic verbal elaborations to be the primary task of therapy. Discussion of whether such cognitive interventions are successful, for the reasons cognitive therapists say they are, is beyond the scope of this paper. Rather, we simply highlight the finding that many depressed individuals appear to have become depressed in the absence of environmental histories that would indicate such a response to be adaptive, and point to verbal behavior to account for the elaboration of such histories into a disorder. Language vastly expands the range of situations that can function as depression-eliciting and depression-maintaining stimuli, because the functions of the stimuli largely may be determined by one's idiosyncratic verbal learning history.

As an example, a depressed individual may respond to all social events as participating in a verbal relation with a host of other aversive stimuli (e.g., the words *fake*, *small-talk*, *embarrassment*, *boring*, *stressful*, *idiot*, *foolish*, *exposed* and the words for a range of aversive private sensations germane to escape, panic, etc.). Although another individual may respond to the relation between the stimuli *party* and *stressful* on occasion, there is flexibility in responding based on other historical and contextual features. For the depressed individual, however, this verbal class

may be so well formed through a fairly idiosyncratic history of verbal and nonverbal pairings of these stimuli, and so negatively reinforced through past derived escape and avoidance experiences, that there may be few or no contexts in which the term *party* does not elicit the functions of other aversive stimuli or function as a derived discriminative stimulus for escape or avoidance. This rigid avoidance repertoire vastly narrows the range of behavioral options available and most likely will lead to rather stable reductions in response-contingent social reinforcement.

The Function of Rumination

In addition to negative cognitive content in depression, research clearly identifies a particular ruminative cognitive style in depression. In fact, a ruminative cognitive style predicts the onset (Just & Alloy, 1997; Nolen-Hoeksema, 2000), length (Umberson, Wortman, & Kessler, 1992), and severity (Nolen-Hoeksema, Parker, & Larson, 1994) of depressive episodes. Depressed individuals may spend long periods of time “lost in thought,” rehashing events of the day and stewing over problems; this leads to increased negatively biased thoughts, poor problem solving, inhibition of operant behavior, impaired concentration, increased stress, and increased problems (Lyubomirsky & Tkach, 2004). A complete behavioral analysis of depression needs to account for the relation between negative cognitive content and depressed mood as well as the function of rumination.

An appreciation of the somewhat unique features of verbal behavior in terms of antecedent and consequential control provides some insight into the function of rumination in depression. First, it bears repeating that thinking, like any behavior, is under the control of multiple and complex historical and situational

stimuli. Consider a depressed student attending a lecture in a class in which she is doing poorly. She is having a hard time keeping up with the professor, and thoughts about her poor performance on the last test occur. The initial stimuli for such thoughts are obvious. As this continues, it is common that this student may end up thinking about a completely different topic, with unexpected twists and turns in thought, arriving at thoughts that she will never get her degree, that there must be something wrong with her brain, and that she is a complete failure. She now begins to think about a negative interaction with a friend the previous day, and thinks that her friendship was never genuine, that she is a failure as a friend as well as in school, and so forth. These twists and turns may increasingly be under the stimulus control of previous thoughts and decreasingly under the control of the current external environment. As described by RFT, the contextual cues that occasion relational framing and its content may themselves be relational and arbitrary in nature; thus, other than previous verbal behavior (which may be private), little environmental support is necessary to occasion verbal behavior and control its content. This in fact is consistent with Skinner's (1953) account. As Skinner put it, "The speaker's own verbal behavior automatically supplies stimuli for echoic, textual, or intraverbal behavior, and these in turn generate stimuli for further responses" (p. 439). He referred to such a thinking process as a "simple soliloquy" and noted, "Regardless of the respectability of the connections, such a 'train of thought' ... is scarcely to be distinguished from a 'flight of ideas'" (p. 439). We may refer to such thinking instead as rumination.

The question of reinforcing variables for such behavior remains. RFT suggests that verbal behavior occurs so frequently and relentlessly

because of a history of reinforcement provided by the wider community for coherence or sense making in one's verbal behavior (see Hayes et al., 1999). It is argued that during early language-training experiences, the verbal behavior of the speaker is evaluated for coherence by the verbal community and is differentially reinforced. Over time, these processes (the verbal behavior, its evaluation in terms of coherence, and its reinforcement) become covert and automatic so that the derivation and rehearsal of coherent verbal relations becomes self-reinforcing (see Barnes-Holmes et al., 2001). Skinner (1953) highlighted that thinking is productive, in that it has an effect on the thinker and is reinforcing because it does so. Both processes are undoubtedly applicable. We would like the depressed student to think about her class performance and the poor friend interaction in such a way that it leads to improved performances and interactions in the future, but in many cases it does not. More likely is an avoidance function—the rumination may function to reduce the anxiety about the class performance and the interaction without increasing the anxiety of dealing with the problems in the moments they occur. As long as the cognitive solutions make sense and reduce anxiety, the rumination may continue, even if it is ultimately unproductive.

Accepting that sense making is reinforcing, one may still argue that the content of rumination often does not make sense and should not be reinforcing. In the current example, one poor performance in a class does not make one a failure as a student, and one poor friend interaction does not make one a failure as a friend. Indeed, pointing out that such content is not logical and is not evidence based is the hallmark of cognitive therapy (Beck et al., 1979). However, to a behavior analyst sense making is idiographic and occurs in the context of the individual's unique history and

experiences. For this individual, we would expect a history in which other negative experiences were interpreted as evidence of complete failure by caregivers and important others, or something similar (Bolling, Kohlenberg, & Parker, 2000). The current context also plays a role: The negative affect of depression provides a context in which interpretations of failure make sense, and the interpretation of friendship failure makes sense given the previous interpretation of school failure.

An important point is that as this individual continues to ruminate, the class lecture is continuing and the student is now largely divorced from contact with any potentially external controlling variables. Thus, verbal behavior, when it occurs, may be quite relentless in overpowering, transforming, and reducing environmental control. As seen in the example of rumination, if the aforementioned student continues ruminative thought throughout her class period she would not be engaged in class discussions and would therefore miss any opportunities of praise or encouragement from the professor. She may also miss necessary information for her next assignment, thereby not only reducing her rate of receiving response-contingent reinforcement but also increasing the likelihood of punishment through a lowered grade. After leaving class and realizing this mistake, she may continue to ruminate now about her difficulty in lecture as well as her previous interaction, which results in further attentional distancing from her immediate environment and additional negative affect.

SUMMARY AND CONCLUSIONS

There are many pathways to depression. *Depression* is not a precise, technical term, has no essential composition, and is not a syndrome. The term refers to a core experience of feeling sad or down and to associated

symptoms that vary widely. This symptomatic heterogeneity is due to the heterogeneity of historical antecedents and consequences. The core experience may be seen as an elicited by-product of losses of, reductions in, or persistently insufficient levels of positive reinforcement. However, Lewinsohn (1974), with his focus on environments characterized directly by losses of response-contingent positive reinforcement, presented a fairly unitary operant model that obscured the heterogeneity of depressive symptom profiles. Given the ubiquity of depression and the diversity of its symptom presentations, both reductions in positive reinforcement and increases in aversive control may function as enduring motivating operations (Dougher & Hackbert, 2000). Of course, multiple sources of control are probable. Thus, idiographic assessment is required to determine both the relative importance of positive and aversive control and to determine specific target variables for any given individual. Clinical behavior analysts treating depression would be well served to engage in detailed, idiographic, and historical functional assessments that inform treatment course and technique.

We argue that a modern behavioral account of depression must incorporate controlling variables at both environmental and interoceptive levels, with a recognition of the role of avoidance and verbal behavioral processes. We have emphasized that the core experience of depression is a private event—elicited negative affect that is felt and tacted in a variety of ways. This affect itself is not problematic and is in fact adaptive, but it becomes chronic, maladaptive, or dysregulated through environmental and learned behavioral processes. A key process may be avoidance: Responses to the original private events that function to avoid or escape the event may be negatively reinforced and establish a cycle of increasing

negative affect and avoidance, a vicious spiral into depression.

Verbal processes may be particularly important as well, in that research on stimulus equivalence and RFT clearly demonstrates how private stimulus events can be transformed and elaborated when related verbally to other events. Thus, stimulus events that would not otherwise function to elicit depressive affect may come to do so through verbal processes, already aversive stimuli may become more so through verbal processes, and verbal processes may establish avoidance and other dysfunctional responses to such stimuli that otherwise would not be established. Rumination—a hallmark feature of depression—is an example of how verbal behavioral processes may result in negative reinforcement through reducing contact with the current physical environment but exacerbate depressive functioning. Behavior-analytic research on the role of verbal processes in depression is in its infancy, but as research in these areas continues to accumulate, analyses of complex phenomena such as depression may benefit greatly.

REFERENCES

- Allen, N. B., & Badcock, P. B. T. (2003). The social risk hypothesis of depressed mood: Evolutionary, psychosocial, and neurobiological perspectives. *Psychological Bulletin*, 129, 887–913.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders*, (text rev.). Washington, DC: Author.
- Antonuccio, D. O., Thomas, M., & Danton, W. G. (1997). A cost-effectiveness analysis of cognitive behavior therapy and fluoxetine (Prozac) in the treatment of depression. *Behavior Therapy*, 28, 187–210.
- Augustson, E. M., & Dougher, M. J. (1997). The transfer of avoidance evoking functions through stimulus equivalence classes. *Journal of Behavior Therapy & Experimental Psychiatry*, 28, 181–191.
- Averill, J. (1968). Grief: Its nature and significance. *Psychological Bulletin*, 70, 721–748.
- Barlow, D. H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York: Guilford.
- Barnes, D., & Roche, B. (1996). Relational frame theory and stimulus equivalence are fundamentally different: A reply to Saunders' commentary. *The Psychological Record*, 46, 489–507.
- Barnes-Holmes, D., & Barnes-Holmes, Y. (2000). Explaining complex behavior: Two perspectives on the concept of generalized operant classes? *The Psychological Record*, 50, 251–265.
- Barnes-Holmes, D., Hayes, S. C., Dymond, S., & O'Hara, D. (2001). Multiple stimulus relations and the transformation of stimulus functions. In S. C. Hayes, D. Barnes-Holmes, & B. Roche (Eds.), *Relational frame theory: A post-Skinnerian account of human language and cognition* (pp. 51–71). New York: Plenum.
- Barnett, P. A., & Gotlib, I. H. (1988). Psychosocial functioning and depression: Distinguishing among antecedents, concomitants, and consequences. *Psychological Bulletin*, 104, 97–126.
- Baruch, D. E., Kanter, J. W., Busch, A. M., Richardson, J. V., & Barnes-Holmes, D. (2007). The differential effect of instructions on dysphoric and non-dysphoric individuals. *The Psychological Record*, 57, 543–554.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford.
- Billings, A. G., & Moos, R. H. (1984). Chronic and nonchronic unipolar depression: The differential role of environmental stressors and resources. *Journal of Nervous & Mental Disease*, 172, 65–75.
- Blackledge, J. T. (2003). An introduction to relational frame theory: Basics and applications. *The Behavior Analyst Today*, 3, 421–433.
- Bolling, M., Kohlenberg, R., & Parker, C. (2000). Behavior analysis and depression. In M. Dougher (Ed.), *Clinical behavior: Analytic approaches to treatment* (pp. 127–152). Reno: Context Press.
- Bowlby, J. (1980). *Attachment and loss: Vol. 3. Loss, sadness and depression*. New York: Basic Books.
- Ceci, S. J., & Williams, W. M. (1999). *The nature-nurture debate: The essential readings*. Malden, MA: Blackwell.
- Clark, D. A., Beck, A. T., & Alford, B. A. (1999). *Scientific foundations of cognitive theory and therapy of depression*. New York: Wiley.
- Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, 100, 316–336.
- Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, 103, 103–116.
- Corwin, J. V., & O'Donohue, W. T. (1995). Evolutionary theory and behavior therapy.

- In W. T. O'Donohue & L. Krasner (Eds.), *Theories of behavior therapy: Exploring behavior change* (pp. 475–494). Washington, DC: American Psychological Association.
- Coyne, J. C. (1976). Toward an interactional description of depression. *Psychiatry: Journal for the Study of Interpersonal Processes*, 39, 28–40.
- Davidson, R. J., Pizzagalli, D., Nitschke, J. B., & Putnam, K. (2002). Depression: Perspectives from affective neuroscience. *Annual Review of Psychology*, 53, 545–574.
- Dougher, M. J., Augustson, E., Markham, M. R., Greenway, D. E., & Wulfert, E. (1994). The transfer of respondent eliciting and extinction functions through stimulus equivalence. *Journal of the Experimental Analysis of Behavior*, 62, 331–351.
- Dougher, M. J., & Hackbert, L. (1994). A behavior-analytic account of depression and a case report using acceptance-based procedures. *The Behavior Analyst*, 17, 321–334.
- Dougher, M. J., & Hackbert, L. (2000). Establishing operations, cognition, and emotion. *The Behavior Analyst*, 23, 11–24.
- Dymond, S., & Barnes, D. (1995). A transformation of self-discrimination response functions in accordance with the arbitrarily applicable relations of sameness, more than, and less than. *Journal of the Experimental Analysis of Behavior*, 64, 163–184.
- Dymond, S., & Rehfeldt, R. A. (2001). Supplemental measures of derived stimulus relations. *Experimental Analysis of Human Behavior Bulletin*, 19, 8–12.
- Eifert, G. H., Beach, B. K., & Wilson, P. H. (1998). Depression: Behavioral principles and implications for treatment and relapse prevention. In J. J. Plaud & G. H. Eifert (Eds.), *From behavior theory to behavior therapy* (pp. 68–97). Needham Heights, MA: Allyn & Bacon.
- Ferster, C. B. (1973). A functional analysis of depression. *American Psychologist*, 28, 857–870.
- Frank, E., Prien, R. F., Jarrett, R. B., Keller, M. B., Kupfer, D. J., & Lavori, P. W., et al. (1991). Conceptualization and rationale for consensus definitions of terms in major depressive disorder: Remission, recovery, relapse, and recurrence. *Archives of General Psychiatry*, 48, 851–855.
- Frankel, V. (1984). *Man's search for meaning*. New York: Simon and Schuster.
- Frijda, N. H. (1994). Varieties of affect: Emotions and episodes, moods, and sentiments. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 59–67). New York: Oxford University Press.
- Friman, P. C., Hayes, S. C., & Wilson, K. G. (1998). Why behavior analysts should study emotion: The example of anxiety. *Journal of Applied Behavior Analysis*, 30, 137–156.
- Gilbert, P. (1992). *Depression: The evolution of powerlessness*. New York: Guilford.
- Gotlib, I. H., & Lee, C. M. (1989). The social functioning of depressed patients: A longitudinal assessment. *Journal of Social and Clinical Psychology*, 8, 223–237.
- Hayes, S. C. (1998). Resisting biologism. *The Behavior Therapist*, 21, 95–97.
- Hayes, S. C., & Barnes, D. (1997). Analyzing derived stimulus relations requires more than the concept of stimulus class. *Journal of the Experimental Analysis of Behavior*, 68, 225–233.
- Hayes, S. C., Barnes-Holmes, D., & Roche, B. (Eds.). (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*. New York: Kluwer/Plenum.
- Hayes, S. C., & Brownstein, A. J. (1986). Mentalism, private events, and scientific explanation: A defense of B. F. Skinner's view. In S. Modgil & C. Modgil (Eds.), *B. F. Skinner: Consensus and controversy* (pp. 207–218). Sussex, England: Falmer.
- Hayes, S. C., & Follette, W. C. (1992). Can functional analysis provide a substitute for syndromal classification? *Behavioral Assessment*, 14, 345–365.
- Hayes, S. C., & Ju, W. (1998). The applied implications of rule-governed behavior. In W. T. O'Donohue (Ed.), *Learning and behavior therapy* (pp. 374–391). Needham Heights, MA: Allyn & Bacon.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford.
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Emotional avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, 64, 1152–1168.
- Herrnstein, R. J. (1970). On the law of effect. *Journal of the Experimental Analysis of Behavior*, 13, 243–266.
- Hopko, D., Lejuez, C., Ruggiero, K., & Eifert, G. (2003). Contemporary behavioral activation treatments for depression: Procedures, principles and progress. *Clinical Psychology Review*, 23, 699–717.
- Ingram, R. E., Miranda, J., & Segal, Z. V. (1998). *Cognitive vulnerability to depression*. New York: Guilford.
- Joiner, T. E., & Metalsky, G. I. (2001). Excessive reassurance seeking: Delineating a risk factor involved in the development of depressive symptoms. *Psychological Science*, 12, 371–378.
- Just, N., & Alloy, L. A. (1997). The response styles theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology*, 106, 221–229.
- Kanter, J. W., Baruch, D. E., & Gaynor, S. T. (2006). Acceptance and commitment therapy and behavioral activation for the treatment of depression: Description and comparison. *The Behavior Analyst*, 29, 161–185.

- Keller, M. B. (1994). Depression: A long-term illness. *British Journal of Psychiatry*, 165, 9–15.
- Keller, M. C., & Nesse, R. M. (2006). The evolutionary significance of depressive symptoms: Different adverse situations lead to different depressive symptom patterns. *Journal of Personality and Social Psychology*, 91, 316–330.
- Kessler, R. C. (1997). The effects of stressful life events on depression. *Annual Review of Psychology*, 48, 191–214.
- Kessler, R. C., McGonagle, K. A., Swartz, M., Blazer, D. G., & Nelson, C. B. (2003). Sex and depression in the National Comorbidity Survey: I. Lifetime prevalence, chronicity and recurrence. *Journal of Affective Disorders*, 29, 85–96.
- Leahy, M. (1997). Alterations in individuals' behaviour in contexts of high-risk environments. *Journal of Personality*, 22, 339–406.
- Lejuez, C. W., Hopko, D. R., & Hopko, S. D. (2001). A brief behavioral activation treatment for depression: Treatment manual. *Behavior Modification*, 25, 255–286.
- Lewinsohn, P. M. (1974). A behavioral approach to depression. In R. J. Friedman & M. M. Katz (Eds.), *Psychology of depression: Contemporary theory and research* (pp. 157–178). Oxford, England: Wiley.
- Lindal, E., & Stefánsson, J. G. (1991). The frequency of depressive symptoms in a general population with reference to DSM-III. *International Journal of Social Psychiatry*, 37, 233–241.
- Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford.
- Lyubomirsky, S., & Tkach, C. (2004). The consequences of dysphoric rumination. In C. Papageorgiou & A. Wells (Eds.), *Depressive rumination: Nature, theory and treatment* (pp. 21–42). Oxford, England: Wiley.
- Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001). *Depression in context: Strategies for guided action*. New York: Norton.
- Mazure, C. M. (1998). Life stressors as risk factors in depression. *Clinical Psychology: Science & Practice*, 5, 291–313.
- McAuliffe, D. (2003). *Rule-following and depressive symptomatology in an adolescent population: An experimental analysis*. Unpublished doctoral dissertation, National University of Ireland, Maynooth.
- McGuire, M. T., & Troisi, A. (1998). Prevalence differences in depression among males and females: Are there evolutionary explanations? *British Journal of Medical Psychology*, 71, 479–491.
- Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology*, 49, 377–412.
- Monroe, S. M., & Depue, R. A. (1991). Life stress and depression. In J. Becker & A. Kleinman (Eds.), *Psychosocial aspects of depression* (pp. 1101–1130). Hillsdale, NJ: Erlbaum.
- Moore, J. (1980). On behaviorism and private events. *The Psychological Record*, 30, 459–475.
- Moscovitch, D. A., Hofmann, S. G., Suvak, M. K., & In-Albon, T. (2005). Mediation of changes in anxiety and depression during treatment of social phobia. *Journal of Consulting and Clinical Psychology*, 73, 945–952.
- Nesse, R. M. (2000). Is depression an adaptation? *Archives of General Psychiatry*, 57, 14–20.
- Nettle, D. (2004). Evolutionary origins of depression: A review and reformulation. *Journal of Affective Disorders*, 81, 91–102.
- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, 109, 504–511.
- Nolen-Hoeksema, S., Parker, L. E., & Larson, J. (1994). Ruminative coping with depressed mood following loss. *Journal of Personality and Social Psychology*, 67, 92–104.
- O'Hara, D., Barnes-Holmes, D., Roche, B., & Smeets, P. M. (2004). Derived relational networks and control by novel instructions: A possible model of generative verbal responding. *The Psychological Record*, 54, 437–460.
- O'Hara, D., Roche, B., Barnes-Holmes, D., & Smeets, P. (2002). Response latencies to multiple derived stimulus relations: Testing two predictions of relational frame theory. *The Psychological Record*, 52, 51–75.
- Ottensbreit, N. D., & Dobson, K. S. (2004). Avoidance and depression: The construction of the cognitive-behavioral avoidance scale. *Behaviour Research & Therapy*, 42, 293–313.
- Overmier, J. B., & Seligman, M. E. P. (1967). Effects of inescapable shock upon subsequent escape and avoidance responding. *Journal of Comparative and Physiological Psychology*, 63(1), 28–33.
- Paykel, E. S. (1982). Psychopharmacology of suicide. *Journal of Affective Disorders*, 4, 271–273.
- Price, J. S. (1967). The dominance hierarchy and the evolution of mental illness. *Lancet*, 7502, 243–246.
- Price, J. (1998). The adaptive function of mood change. *British Journal of Medical Psychology*, 71, 465–477.
- Price, J., Sloman, L., Gardner, R., Gilbert, P., & Rohde, P. (1994). The social competition hypothesis of depression. *British Journal of Psychiatry*, 164, 309–315.
- Rehm, L. P. (1979). A comparison of self-control and assertion skills treatments of depression. *Behavior Therapy*, 10, 429–442.
- Rehm, L. P. (1989). Behavioral models of anxiety and depression. In P. C. Kendall & D. Watson (Eds.), *Anxiety and depression:*

- Distinctive and overlapping features* (pp. 55–79). San Diego: Academic Press.
- Rehm, L. P., & Plakosh, P. (1975). Preference for immediate reinforcement in depression. *Journal of Behavior Therapy and Experimental Psychiatry*, 6, 101–103.
- Roche, B., & Barnes, D. (1996). Arbitrarily applicable relational responding and sexual categorization: A critical test of the derived difference relation. *The Psychological Record*, 46, 451–475.
- Roche, B., & Barnes, D. (1997). A transformation of respondently conditioned stimulus function in accordance with arbitrarily applicable relations. *Journal of the Experimental Analysis of Behavior*, 67, 275–301.
- Rosenfarb, I. S., Burker, E. J., Morris, S. A., & Cush, D. T. (1993). Effects of changing contingencies on depressed and nondepressed individuals. *Journal of Abnormal Psychology*, 102, 642–646.
- Schnaitter, R. (1978). Private causes. *Behaviorism*, 6, 1–12.
- Schulberg, H. C., Katon, W., Simon, G. E., & Rush, A. J. (1998). Treating major depression in primary care practice: An update of the Agency for Health Care Policy and Research Practice guidelines. *Archives of General Psychiatry*, 55, 1121–1127.
- Shapiro, S. (1984). Utilization of health and mental health services: Three epidemiologic catchment area sites. *Archives of General Psychiatry*, 41, 971–978.
- Sidman, M. (1994). *Equivalence relations and behavior: A research story*. Boston: Authors Cooperative.
- Simpson, J., & Weiner, E. (Eds.). (1989). *Oxford English dictionary* (2nd ed.). Cary, NC: Oxford University Press.
- Skinner, B. F. (1945). The operational analysis of psychological terms. *Psychological Review*, 52, 270–277.
- Skinner, B. F. (1953). *Science and human behavior*. Oxford, England: Macmillan.
- Skinner, B. F. (1974). *About behaviorism*. New York: Knopf.
- Steele, D., & Hayes, S. C. (1991). Stimulus equivalence and arbitrarily applicable relational responding. *Journal of the Experimental Analysis of Behavior*, 56, 519–555.
- Turkheimer, E. (1998). Heritability and biological explanation. *Psychological Review*, 105, 782–791.
- Umberson, D., Wortman, C. B., & Kessler, R. C. (1992). Widowhood and depression: Explaining long-term gender differences in vulnerability. *Journal of Health and Social Behavior*, 33, 10–24.
- Wallace, J., Schneider, T., & McGuffin, P. (2002). Genetics of depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 169–191). New York: Guilford.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96, 465–490.
- Watson, P. J., & Andrews, P. W. (2002). Toward a revised evolutionary adaptationist analysis of depression: The social navigation hypothesis. *Journal of Affective Disorders*, 72, 1–14.
- Whelan, R., & Barnes-Holmes, D. (2004). A derived transformation of consequential functions in accordance with the relational frames of same and opposite. *Journal of the Experimental Analysis of Behavior*, 82, 177–195.
- Whelan, R., Barnes-Holmes, D., & Dymond, S. (2006). The transformation of consequential functions in accordance with the relational frames of more than and less than. *Journal of the Experimental Analysis of Behavior*, 86, 317–335.
- Wingert, P., & Kantrowitz, B. (2002, October 7). Young and depressed. *Newsweek*, 53–61.